Abt

Abt Associates Inc.

Consumer Responses to Advertisements for Potential Reduced-Exposure Products

Cambridge, MA
Lexington, MA
Hadley, MA
Bethesda, MD
Washington, DC
Chicago, IL
Cairo, Egypt
Johannesburg, South Africa

July 15, 2001

Prepared for
Dr. Gregory Connolly
Massachusetts Tobacco
Control Program,
Massachusetts Department of
Public Health
250 Washington St. – 4th
Floor
Boston, MA 02148

Abt Associates Inc.
55 Wheeler Street
Cambridge, MA 02138

Prepared by
William L. Hamilton
Tammy K. Ouellette
William M. Rhodes

This research was conducted under contract to the Massachusetts Department of Public Health as part of the Independent Evaluation of the Massachusetts Tobacco Control Program.

Table of Contents

List of Tables

Summary of Key Findings

The Study of Consumer Response to Advertisements for Potential Reduced-Exposure Tobacco Products was initiated by the Massachusetts Department of Public Health (MDPH) due to concerns that advertising may generate inaccurate smoker perceptions of the health risks associated with these products.

The study's results support these concerns. They provide clear evidence that smokers who view PREP (potential reduced-exposure product) tobacco product advertisements conclude that these products pose lower tobacco-related health risks than conventional Regular or Light cigarettes.

Study results are based on a convenience sample of 600 smokers 18-65 years old and current Massachusetts residents. Respondents were asked to examine selected advertisements for Regular cigarettes, Light cigarettes, and PREP tobacco products (ADVANCE, Eclipse, and Omni) and answer questions regarding their perceptions of the products advertised and the messages conveyed by the specific advertisements.

In side-by-side comparisons, smokers indicated that they thought PREP products posed fewer tobacco-related health risks, lower levels of carcinogens, and lower tar levels. Specifically:

- **Smokers perceived PREP tobacco products as having lower health risks than Light or Regular cigarettes.**
- **Smokers perceived PREP tobacco products as having a lower level of things that might cause cancer than Light or Regular cigarettes.**
- **Smokers perceived PREP tobacco products as having a lower level of tar than Regular cigarettes, and a similar level to Lights.**
- **Perceptions of PREP tobacco product's health risks relative to Light cigarettes were generally consistent across subgroups of the study population.**
- **Men, people with lower educational attainment, and white non-Hispanic individuals were more likely than others to perceive that PREP tobacco products pose lower health risks than do Regular cigarettes.**

All of the findings above were statistically significant in multivariate analyses that controlled for selected demographic characteristics (e.g., age, education) and smoking behaviors (e.g., number of cigarettes smoked daily, whether the smoker had tried to quit in the past year).

Prior to participating in this study, only a few smokers had seen advertisements for or had smoked PREP tobacco products. For the vast majority, the primary source of information for assessing PREP tobacco products' properties, including their health and safety, were the advertisements viewed during the study. Their opinions regarding the advertisements included the following:

- **Most smokers interpreted the PREP tobacco product advertisements as conveying positive messages about health and safety.**
- **Many smokers interpreted the PREP advertisements as saying that these products would be helpful in quitting smoking.**
- **Most smokers believed that claims made in cigarette advertisements must be approved by a government agency.**

1: Introduction

Background

For over 50 years there has been clear scientific evidence that exposure to tobacco products poses significant health risks to both the individuals who consume them and to those who come into contact with secondhand or environmental tobacco smoke (ETS). However, despite the generally accepted knowledge that tobacco consumption results in significant adverse health outcomes, large numbers of adults and adolescents continue to use tobacco products. Moreover, due to the addictive nature of the nicotine contained in these products, many smokers find it difficult to quit and as a result continue to expose themselves to the health risks that result from tobacco consumption.

A monograph recently released by the National Institutes of Health shows that the tobacco industry and consumers have responded to the growing awareness of health risks in ways that do not actually reduce those risks (National Cancer Institute, 2001). Tobacco manufacturers introduced cigarettes with filters and other design features that substantially reduced the level of tar delivered by the product in the machine tests used by government agencies. The products were marketed with messages that led consumers to expect lower levels of health risk, and many consumers choose "Light" and "Ultra Light" cigarettes as a means of reducing their risk. But while these cigarettes deliver lower levels of tar and nicotine in machine tests, consumers adjust their smoking patterns in ways that maintain the level of tar and nicotine to which they are actually exposed. The report concludes that "The absence of meaningful differences in smoke exposure when different brands of cigarettes are smoked . . . and the resultant absence of meaningful differences in risk . . . make the marketing of the cigarettes as lower-delivery and lower risk products deceptive for the smoker" (Burns & Benowitz, 2001, p. 1).

Recently, tobacco manufacturers have begun to develop and market two new types of tobacco products that claim further reductions in exposure to toxicants: 1) Cigarettes with a modified tobacco content that reportedly contain lower levels of toxic substances and carcinogens; and 2) cigarette-like products that deliver nicotine with less combustion than conventional products. The Institute of Medicine (IOM), in its recent study of tobacco harm reduction, "Clearing the Smoke" (2001), included these two new classes of tobacco products in its definition of "potential reduced-exposure products," or PREPs. However, even though manufacturers claim reduced levels of toxicant delivery, the IOM concluded that no currently available scientific evidence supports a conclusion that PREP tobacco products result in reduced health risks to smokers or to the general population (IOM, 2001).

Public health, medical and tobacco control professionals are concerned that advertising and marketing for these new modified tobacco and cigarette-like products may lead current and potential future smokers to mistakenly conclude that PREP tobacco products are safer or healthier than other cigarettes, or to view smoking these products as an alternative to smoking cessation. These concerns are grounded in past experience with cigarettes that have been marketed as Low-yield, Low-tar, Light and Ultra Light. Marketing for these latter types of cigarettes has included both explicit and implicit messages regarding the potential for reducing the health risks associated with smoking (IOM, 2001). A recent review of advertising for low-yield cigarettes concluded that advertising for filtered and low-yield cigarettes was "intended to reassure smokers (who were worried about the health risks of smoking) and were meant to prevent smokers from quitting based on those same concerns" and that this advertising has contributed to "consumer ignorance and confusion" regarding low-yield cigarettes' relative healthfulness (Pollay and Dewhirst, 2001, p. 233). As a result, "many smokers choose Light and Ultra-Light brands because they believe that such cigarettes are less likely to cause health problems" (Weinstein, 2001, p 198).

Institute of Medicine Conclusions and Recommendations

The IOM study considered the science base for PREP tobacco products and their relationship to policy strategies that could contribute to a larger policy of tobacco-related harm reduction. For the purposes of that study, a product was identified as "harm-reducing if it lowers total tobacco-related mortality and morbidity even though use of that product may involve exposure to tobacco-related toxicants" (IOM, 2001, p. 2).

From this research, the IOM concluded that regulation of PREP cigarettes is needed to:

> assure that adequate research...is conducted and to assure that the public has current, reliable information as to the risks and benefits of PREPs. Careful regulation of claims is needed to reduce misperception and misuse of the products. If a PREP is marketed with a claim that it reduces (or could reduce) the risk of a specific disease(s) compared to the risk of the product for which it substitutes, regulation is needed to assure that the claim is supported by scientifically sound evidence and that pertinent epidemiological data are collected to verify that claim (IOM, 2001, p. 6).

The study also recommended that:

> A national comprehensive surveillance system is urgently needed to collect information on a broad range of elements necessary to understand the population impact of tobacco products and PREPs, including beliefs, product characteristics, product distribution and usage patterns, and marketing messages such as harm reduction claims and advertising, the incidence of initiation and quitting, and non-tobacco risk factors for tobacco-related conditions (IOM, 2001, p. 8).

Study Purpose and Objectives

The Study of Consumer Response to Advertisements for PREP Tobacco Products was initiated by the Massachusetts Department of Public Health (MDPH) due to concerns about the possibility that advertising messages may generate inaccurate smoker perceptions of the health risks associated with these products. Modified tobacco cigarettes and cigarette-like PREP products either have been or are expected to be marketed to Massachusetts' consumers.

Consistent with the IOM's recommendations for further research, MDPH is interested in determining whether advertisements for PREP tobacco products may lead consumers to believe that these products have fewer undesirable health consequences than Regular, Light or Ultra Light cigarettes, even in the absence of clear scientific evidence that support these conclusions.

Specifically, the study examined six primary research questions:

1. After examining advertisements, do smokers perceive PREP tobacco products as having a lower level of *health risk* than existing Light (including Ultra Light) or Regular cigarette brands?
2. After examining advertisements, do smokers perceive PREP tobacco products as having a lower level of *tar* than existing Light or Regular cigarette brands?

2: Study Design

During May 2002, 600 smokers who were 18-65 years old and current Massachusetts residents were intercepted at Boston-area shopping malls and asked to participate in a special study about their smoking behavior and perceptions of tobacco-related health risks. Study participants were asked to complete a brief interviewer-administered survey in which they examined three cigarette advertisements: one for a Regular cigarette, one for a Light cigarette, and one for a PREP tobacco product. Respondents were then asked questions regarding their perceptions of the cigarette brands they viewed and the messages conveyed by the specific advertisements.

The following sections provide additional detail on how the study's sample was selected, the type of people of who participated in the study, the survey questionnaire, and the print advertisements examined by respondents.

Sample Selection

Study participants were selected as a convenience sample (n=600) of smokers who were 18-65 years old and current Massachusetts residents. These individuals were selected from the larger population of individuals who visited several Boston-area shopping malls during May 2002. To ensure an adequate distribution of study participants across age and gender groups, interviewers were provided with strict selection guidelines that limited the number of participants in six cells that correspond to combinations age and gender categories. (See Table 1.) Study participation was also limited to those individuals who currently smoked – that is, individuals who said they currently smoked cigarettes every day or some days, had smoked 100 or more cigarettes in their lifetime, and had smoked one or more cigarettes during the past 30 days.

Table 1: Distribution of Study Participants by Age and Gender

	Men	Women
Age 18-30	100	100
Age 31-50	100	100
Age 51-65	100	100

Description of Study Participants

Smokers who participated in this study possessed demographic characteristics and smoking behaviors generally similar to the overall population of smokers in Massachusetts. (See Table 2.) Data on Massachusetts smokers come from the Massachusetts Adult Tobacco Survey (MATS), a statewide representative survey carried out by the Center for Survey Research at the University of Massachusetts. The data reported here are based on the 1999 and 2000 MATS surveys, with a sample of over 2,600 smokers.

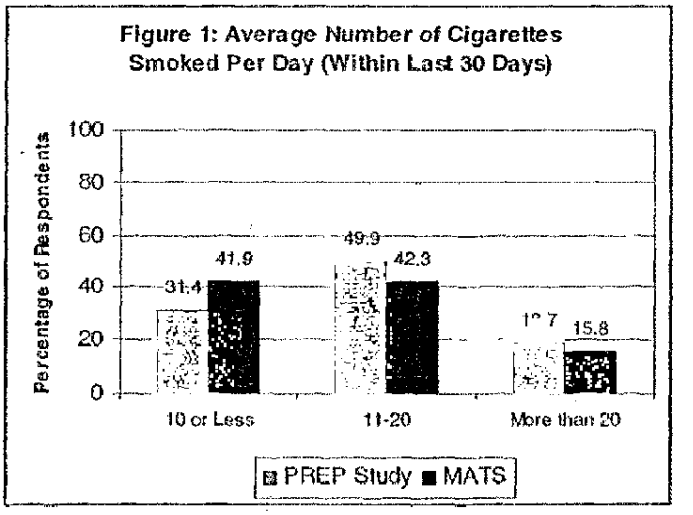
Demographic Characteristics

The study's sample design predetermined the distribution of men and women within different age groups. (See Table 1.) However, despite this predetermined allocation, the distribution of study participants based on gender-by-age categorization was relatively similar to that found in the 1999 and 2000 MATS surveys. The notable exception is in the disproportionately lower percentage of individuals age 31-50 in the study's sample, as compared to the MATS interviews.

The majority of study participants had completed some education beyond high school (56.9%) and nearly three-quarters of respondents were Non-Hispanic, Whites (72.5%).

Smoking Behavior

As seen in Figure 1 and Table 2, participants in this study appeared, on average, to smoke more cigarettes than smokers in the MATS survey. Participants in this study were also more likely to smoke Regular cigarettes than Light or Ultra-Light brands than smokers in the MATS survey. However, study participants did not differ greatly in their attempts to quit smoking within the past year, with 45.8% of study participants and 42.6% of MATS survey respondents having indicated a quit attempt during this time period.



Familiarity with Advertisements Viewed

The majority of smokers who participated in this study (60.8%) had seen at least one advertisement for the brand of Regular cigarette whose advertisement they viewed in the study. Nearly one-third (30.8%) had previously seen an advertisement for the brand of Light cigarette whose advertisement they were given. In contrast, only 7.7% said they had seen an advertisement for the PREP tobacco product prior to viewing it for this study.

About half (49.8%) of the study's participants had smoked the Regular cigarette brand depicted in the advertisement they viewed, while 18.3% had smoked the Light cigarette brand in the advertisement. Only 1.3%, or 8, study participants had ever smoked the PREP tobacco product in the advertisement they viewed.

Table 2: Comparison of Sample Demographic Characteristics and Massachusetts Smokers' Demographic Characteristics

	Study Sample Demographic Characteristics	Massachusetts Smokers' Demographic Characteristics *(Taken from 1999-2000 MATS Full Interview)*
Age		
18-30 years	32.8%	28.6%
31-50 years	34.0%	50.1%
Over 51 years	33.2%	21.3%
Gender		
Female	49.8%	52.8%
Male	50.2%	47.2%
Educational Attainment		
High School Graduate or Less	43.2%	48.7%
Some Education Beyond High School, But Not College Graduate	35.2%	28.2%
College Graduate or Other Higher Educational Degree	21.7%	23.1%
Race Ethnicity		
White, Non-Hispanic	72.5%	86.8%
Non-White	27.5%	13.3%
Average Number of Cigarettes Smoked Per Day (Within Last 30 Days)		
10 or less	31.4%	41.9%
11-20	49.9%	42.3%
More than 20	18.7%	15.8%
Usual Type of Cigarette Smoked		
Regular	62.5%	47.8%
Light/Ultra Light	36.3%	52.2%
Attempted to Quit During Past Year		
Yes	45.8%	42.6%
No	54.2%	57.4%

Key Measures

The measures used in this study were designed to capture data that would address concerns about the extent to which advertisements for PREP tobacco products may lead consumers to believe these products have fewer undesirable health consequences than the conventional cigarettes that currently dominate the marketplace. For purposes of the study, we divide these conventional products into two groups: Regular cigarettes (sometimes referred to as Full Flavor cigarettes), or Light and Ultra-Light cigarettes. For convenience, we refer to these two groups as Regular and Light, where the Light category includes Ultra-Light products.

The survey questions were designed to gain insight into smokers' perceptions of PREP tobacco products and their interpretations of PREP advertising messages in comparison to other cigarette types (Regular and Light). To gauge perceptions, study participants were asked to assess the *health risk*, *amount of tar*, and *level of things that might cause cancer* using a scale from 1 to 10. As a visual aid to interpreting the scale, subjects were shown a card with three "ladders" whose rungs had values from 1 to 10. (The specific question wording is shown in Table 3, and the full questionnaire is appended as Appendix B.) Results from these questions were analyzed in terms of the mean, or average, scale rating for each type of tobacco product.

Study participants were also asked whether they believed that the advertisements they saw contained any of a set of specified messages. Of principal interest are questions about whether the advertisement contained the message that the product is *safer or healthier* than other cigarettes, and whether it will *help someone quit smoking*. Additional questions, intended to diffuse the focus on health issues, asked about messages that the product it *tastes better* than others, and whether it would be a *good one to smoke with friends*. (See Table 4 for specific question wording.) The percentages of individuals who thought these messages were apparent in the advertisements were compared across PREP tobacco products, and between PREPs and Regular and Light cigarettes.

The survey instrument used in this study, including the measures described above, was carefully pre-tested prior to fielding the study to ensure respondent understanding and measure reliability. The questions regarding product perceptions and advertisement messages were found to be effective during the pretest and were not changed substantially for the final study.

Table 3: Product Perception Measures

	Question Wording
Perception Measure 1: Health Risk	This card has three health risk ladders that go from 1 to 10. The bottom rung of the ladder means very low health risk, which implies that if you smoked the cigarette regularly for a long time, like 20 or 30 years you probably wouldn't get a serious health problem. The top rung of the ladder means very high health risk, which implies that if you smoked the cigarette regularly for a long time you'd be very likely to get a serious health problem. Please tell me where you would put each of the three cigarettes on the health risk ladder.
Perception Measure 2: Amount of Tar	Looking at these ladders, please consider these three ads – rating them from 1-10 with respect to the amount of tar you think each product contains. A rating of "10" would mean you see the product as having high tar content and a rating of "1" means you think this cigarette has low tar content.
Perception Measure 3: Level of Things That Might Cause Cancer	Looking at these ladders, please consider these three ads – rating them from 1-10 with respect to the level of things that might cause cancer, you think each product contains. A rating of "10" would mean you see this cigarette as having a high content of things that might cause cancer and a rating of "1" means you think the product has a low content of things that might cause cancer.

Table 4: Advertisement Message Measures

	Question Wording
Introduction	Look at the ad for [AD:1] while I read off some possible messages. For each possible message, tell me whether you think this is what the ad is trying to say.
Advertisement Measure 1: Taste	This cigarette tastes better than others.
Advertisement Measure 2: Safer or Healthier	This cigarette is safer or healthier than others.
Advertisement Measure 3: Peer Acceptance	This cigarette is a good one to smoke when you're with friends.
Advertisement Measure 4: Cessation Aid	This cigarette will help someone quit smoking.

Advertisements Used in Study

The study used two print advertisements for Regular cigarettes (Marlboro and Basic), two print advertisements for Light cigarettes (Carlton Ultra Light and Basic Light), and three print advertisements for PREP tobacco products (Omni, Eclipse and ADVANCE). All of these advertisements appeared in national or regional magazines within the past two years. Copies of the advertisements used in this study are provided in Appendix B.

The Regular and Light advertisements selected for the study were chosen based on a combination of factors to ensure that a mixture of advertisement types and messages were represented in the study. Advertisements that appeared to target a selected demographic subgroup (e.g., women, or African Americans) were excluded. For the Light cigarettes, we selected one advertisement with no explicit emphasis on the low-tar nature of the product, and one that explicitly emphasized this feature.

For the purposes of this study, it was assumed that the PREP tobacco products might be understood by consumers as cigarettes, albeit cigarettes of a new class. However, it is important to note that the PREP tobacco products themselves have differing characteristics.

The Omni PREP tobacco product (produced by Vector Tobacco) came to market in 2001 and is advertised as containing tobacco that has undergone a proprietary treatment that reduces toxicant levels, in particular Polycyclic Aromatic Hydrocarbons (PAH), which have been shown to cause cancer. Similarly, the ADVANCE brand of PREP product (marketed by Star Scientific beginning in 2000) also advertises having modified tobacco that results in a reduced yield of selected toxicants, in particular tobacco-specific nitrosamines. The Eclipse PREP product (marked by R.J. Reynolds beginning in 1996) is considered a "cigarette-like" product that is designed to have less combustion than other cigarettes. The product resembles a cigarette in size and shape, but uses a carbon tip to ignite a mixture of tobacco and glycerin before passing through a charcoal filter. To date, no health benefits have been substantiated with scientific evidence for any of these products.

Study participants were asked to examine one magazine advertisement for a Regular cigarette (either Marlboro or Basic), one advertisement for a Light cigarette (Basic Light or Carlton Ultra Light), and one for a PREP tobacco product (ADVANCE, Eclipse, or Omni). The combination of advertisements and the sequence of questions were varied to avoid any effects that might result from viewing a specific combination of advertisements or being asked first about a particular

advertisements. Study subjects within each of the 6 gender-by-age strata were randomly assigned to 72 groups, defined by the 12 possible combinations of advertisements and the 6 possible orders of presentation (Regular-Light-PREP, Light-PREP-Regular, etc.).

Table 5 includes an overview of the messages contained in each advertisement used in this study. All advertisements included a "Surgeon General's Warning" and the product's tar content. Each of the PREP tobacco product advertisements included additional health risk information. The advertisements seen by study participants were professionally prepared color reprints of the actual magazine advertisements.

Table 5: Messages Included in Advertisements

	Lead Slogan Used in Advertisement	Health Risk Warnings or Messages
Marlboro Regular	"Come to where the flavor is. Come to Marlboro Country."	- Surgeon General's Warning.
Basic Regular	"The Best Things in Life are Basic"	- Surgeon General's Warning.
Carlton Ultra Light	"Isn't It Time You Started Thinking About Number One? Think Carlton. With 1 mg Tar, It's the Ultra Ultra Light."	- Surgeon General's Warning.
Basic Light	"The Best Things in Life are Basic"	- Surgeon General's Warning.
Advance	"A Step in the Right Direction. All of the taste ... Less of the toxins."	- Surgeon General's Warning. - Specific Warning: "There is no such thing as a safe cigarette, nor is there enough available medical information to know if ADVANCE with less toxins will lower health risks." - Specific Message: "ADVANCE contains less toxins than the leading light brands, thanks to a revolutionary new filter design and a patented new method for curing tobacco. Made with premium tobaccos, ADVANCE offers all of the rich, satisfying taste you expect from a great light cigarette."
Eclipse	"The Best Choice for Smokers Who Worry About Their Health is to Quit. Here's the Next Best Choice."	- Surgeon General's Warning. - Specific Warning: "All cigarettes present some health risk, including Eclipse." - Specific Message: "Eclipse, A Better Way to Smoke." - Specific Message: "I had the support of my wife, if I'm going to smoke, she'd prefer I smoke Eclipse. Cecil W., Dallas, Texas"
Omni	"There's only one brand that significantly reduces carcinogens. Made you look!"	- Surgeon General's Warning. - Specific Warning: "Smoking is addictive and dangerous to your health. Reductions in carcinogens (PAHs, nitrosamines, catechols) have NOT been proven to result in a safer cigarette. This product produces tar, carbon monoxide, other harmful by-products, and increased levels of nitric oxide." - Specific Message: " The only cigarette to significantly reduce carcinogens that are among the major causes of cancer. The only one to still deliver premium taste. The only one to finally give smokers a reason to switch. Only Omni."

Data Collection Approach

Study participants were recruited at Boston-area shopping malls by trained field interviewers. To minimize the potential for interviewer error arising from the complex approach used to rotate the combination of advertisements and the order in which the advertisements were to be presented, 600 separate survey packages were prepared in advance. Each package included the specific combination of advertisements to be shown, a questionnaire that reflected the order in which the advertisements were to be presented, and specific question wording that referred to the advertisements in the package. The package also contained a code flag that assigned that questionnaire package to one of the six sample strata. Upon completing the interview, the questionnaire and advertisements were placed in the same envelope and returned for data entry.

Study participants were approached at shopping malls and asked a series of screening questions to determine whether they met the study's requirements for smoking status, age, gender, and residency. Individuals were also screened out of the survey if they were unable to complete the interview in English without assistance, or if they had a physical impairment that prevented them from seeing the advertisements. A total of 3,705 individuals were screened to obtain 600 interviews.

The average survey length was 12 minutes and individuals who completed the survey were provided with a $10 cash "thank you."

Limitations

Despite attempts to balance study participation by age and gender using strict sample selection guidelines, an important limitation in interpreting the study's results is that the study is based on a convenience sample rather than a probability sample. A random sample of the Massachusetts or US smoking population might yield somewhat different results. Nonetheless, the relatively large sample size, together with the consistency of responses across subgroups defined by demographic and smoking-related characteristics (see Table 2), suggest that the general patterns of response observed in the study are likely to be found in broader studies as well.

The study also necessarily examined a limited set of advertisements. Other advertisements for the same products, or advertisements for different products, might have elicited different responses from study participants. This point is particularly applicable to the PREP tobacco products, because hardly any participants had previously seen advertising for or had direct experience with these products. We therefore focus mainly on comparisons involving groups of products (e.g., PREP tobacco products compared to Regular cigarettes), averaging the responses to multiple advertisements.

3: Perceptions of PREP Tobacco Products

Summary of Findings

- ***Smokers perceived PREP tobacco products as having a lower health risk than Light or Regular cigarettes.***
  Study participants gave PREP tobacco products an average rating of 5.4 on a 10-point health risk scale, compared to averages of 5.8 and 8.2 for Light and Regular cigarettes, respectively. Both differences are statistically significant.

- ***Smokers perceived PREP tobacco products as having a lower level of tar than Regular cigarettes and a similar level to Lights.***
  The average PREP rating was 5.3, not significantly different from the Light average of 5.4 but significantly less than the Regular average of 8.4.

- ***Smokers perceived PREP tobacco products as having a lower level of things that might cause cancer than Light or Regular cigarettes.***
  PREP tobacco products scored an average of 6.6, significantly less than the average for either Light (6.9) or Regular (8.8) cigarettes.

Analytic Approach

After viewing an advertisement for a Regular cigarette, a Light cigarette, and a PREP tobacco product, respondents were asked to assess the *health risk, amount of tar,* and the *level of things that might cause cancer* associated with each specific product using a health risk ladder scaled from 1 to 10. (For specific questionnaire wording, see Key Measures in Section 2.) For each of these three measures, we tested the difference in mean responses for the three product types: PREPs, Regular cigarettes, and Light cigarettes. Table 7 shows the mean responses on the health risk scale for each of the product types, as well as for the three PREP tobacco products separately.

The comparison between mean responses (i.e., the test for significance of the difference between response means) was accomplished using a Tobit model with random effects (as programmed in the LIMDEP statistical software program). The Tobit model was selected for its ability to account for the effects of censored data at either end of the health risk ladder (i.e. at 1 and 10) and the tendency for data to be concentrated at the scale's upper limit. Due to software limitations, the lower limit of 1 was ignored in our data censoring. Given that the distribution of responses were not clustered at this lower limit (see Figures 2, 3, and 4 below), we can assume that ignoring the lower limit in our model introduced few, if any, negative consequences. The random effect term was used to account for clustering that was introduced by the fact that each respondent answered three questions.

The Tobit model incorporated the following set of control variables:

- Age (Dummy variables for age ranges 18-30, 31-50, and 51-65 years).
- Gender (Dummy variable for whether the respondent was female).
- Race (Dummy variable for whether the respondent was a Non-Hispanic White).

- The number of cigarettes typically smoked per day (Dummy variables for 1-10, 11-20, >20 cigarettes per day).

- Type of cigarette smoked (Dummy variable for whether the respondent normally smoked Regular cigarettes as opposed to Light, Ultra Light, or Other cigarettes).

- Whether or not a respondent tried to quit smoking within the last 12 months (Dummy variable for having made a quit attempt).

Control variables were incorporated into the model to minimize the possibility that the estimated effects could result from differences in the characteristics of the individuals who viewed particular advertisement combinations. Including covariates may also increase the precision of comparisons by accounting for some of the variance in the dependent variable. Ignoring the censoring, the model was specified as follows:

$$H_{ij} = \alpha_i + \sum_{k=1}^{7} S_{ik}\beta_k + X_i\delta + e_{ij}$$

Where:

i	is the ith respondent, i=1..599.[1]
j	is the jth stimulus, j=1..7.
H_{ij}	is the response given by the ith respondent to the jth stimulus.
S_i	is a dummy variable coded one when the ith respondent is responding to the jth stimulus, that is, when j = k; otherwise coded zero.
X_i	is a row vector of control variables
α_i	is a random effect, assumed to be distributed as normal with mean 0 and standard deviation σ_α^2.
β_k	is the estimated mean for stimuli k setting the control variables to zero.
δ	are parameters for the control variables
e	is a random error term with variance σ_2^2.

One potential criticism of the Tobit model is that the underlying scale may not be truly linear (e.g., that the distance between "3" and "4" on the scale may not be the same in the respondent's mind as the distance between "9" and "10"). An alternative model is an ordered Probit model, which recognizes the order of responses but does not attach significance to the numeric difference between the steps between ratings. We therefore estimated an ordered Probit model as a check on the inferences from the Tobit model. Results from the two models were found not to be materially different.

Smokers' Perceptions of Product Properties

Smokers were asked to assess the *health risk, amount of tar*, and *level of things that might cause cancer* associated with each specific tobacco type using a ladder scaled from 1 to 10. In the following sections, we describe the results of these assessments.

Perception of Health Risk

[1] One case was omitted due to missing data.

Smokers rated PREP tobacco products lower on the health risk ladder than they rated either Regular or Light cigarettes. As shown in Table 7, the mean rating for PREP tobacco products as a group was 5.4 on the 10-point health risk ladder. This is lower than the mean of 5.8 for Light cigarettes and well below the mean of 8.2 for Regular cigarettes. PREP ratings were statistically different from the ratings for both the Regular and the Light cigarettes when controlling for demographic characteristics and smoking behaviors ($p = 0.001$).[2]

Figure 2: Distribution of Responses for Perceived Level of Health Risk

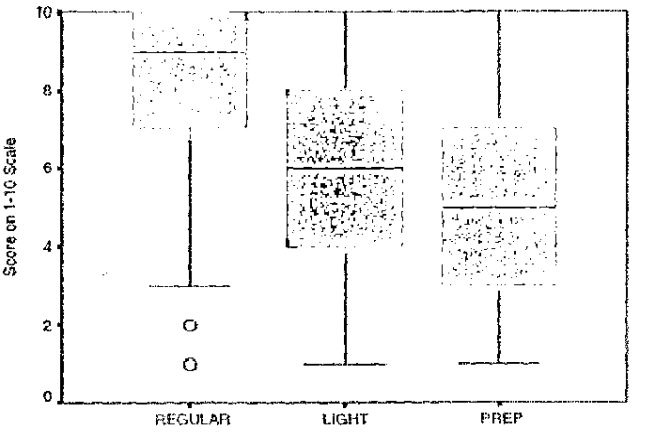


Figure 2 describes the distribution of responses on the health risk ladders reported by smokers when they were asked to rate the level of health risk associated with Regular, Light and PREP tobacco products. The plot is based on the median, quartiles, and extreme values of these responses, with the shaded box representing the interquartile range that contains 50% of the response values. The lines that extend from the highest and lowest values, excluding outliers (noted by an "O") and extreme values (noted by an "*").

As the figure illustrates, the distribution of responses for Regular cigarettes is quite different from that for either Light cigarettes or PREP tobacco products, showing a strong perception that Regular cigarettes pose the greatest perceived health risk. The distributions for PREP tobacco products and Lights are more similar, with some smokers rating each type of product as having very high health risk while others see little risk. Nonetheless, the difference in the bulk of the ratings indicates a lower perceived health risk for PREP tobacco products than for Light cigarettes.

The mean responses for ADVANCE, Eclipse, and Omni were also compared separately to the means for Light and Regular cigarettes. The results were consistent with the group comparisons noted above. That is, respondents viewed ADVANCE (mean = 5.6), Eclipse (mean = 5.1), and Omni (mean = 5.6) cigarettes as each having a significantly lower health risk than Light or Regular cigarettes ($p = 0.05$ or less).

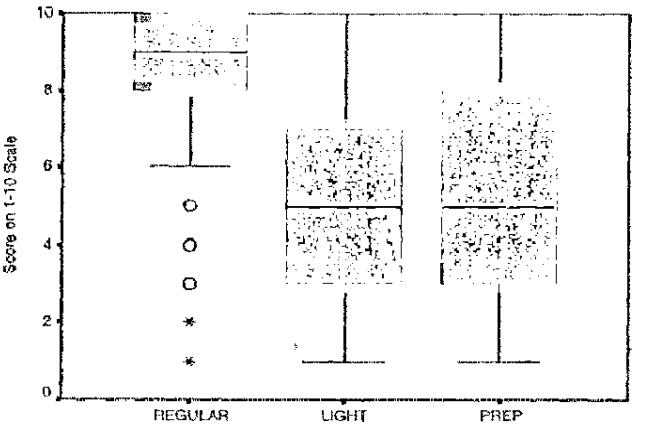
These results indicate that smokers perceive PREP tobacco products as posing lower health risks than either Regular or Light cigarettes. It is striking that this general pattern appeared for all three of the PREP products. Consumers would not be expected to have a generic preconception of PREP properties, because very few people are familiar with any of these products (only 7.7% of the 600 study participants said that they had previously seen an advertisement for the PREP product they saw). Study participants' information about the PREP products therefore came almost exclusively from the advertisement that they were shown, and the advertisements did differ in their approach, as described in Section 2. Across these varying advertising strategies, however, participants drew the conclusion that the PREP tobacco products posed lower risk than the Regular or Light cigarette.

Perception of Amount of Tar

[2] All tests were one-tailed tests of significance.

Based on the advertisements viewed, smokers who participated in this study perceived PREP tobacco products as having lower levels of tar than Regular cigarettes. Survey respondents rated PREP tobacco products (mean = 5.3) substantially lower on the 10-point ladder for tar than Regular cigarettes (mean = 8.4). (See Figure 2 and Table 7.) The difference in ratings was statistically significant when controlling for demographic characteristics and smoking behaviors ($p = 0.001$).

Figure 3: Distribution of Responses for Perceptions of the Amount of Tar



Study participants perceived PREP tobacco products as having levels of tar roughly similar to those of Light cigarettes. The mean ratings were quite similar (5.3 and 5.4, respectively) and not significantly different. More substantial differences were visible across the three PREP tobacco products, with mean scores ranging from 4.6 for Eclipse to 5.8 for Omni. Ratings for Eclipse were statistically different from those for Light cigarettes as a group ($p = 0.01$). Neither the ADVANCE nor Omni ratings differed significantly from those for the Light group.

The responses regarding tar levels must be considered in light of the fact that tar levels (as measured by the Federal Trade Commission method) are actually included in the advertisements that the study participants saw. Table 6 provides a summary of the tar levels for the specific brands used in this study.

Table 6: Amount of Tar Contained in Cigarette Brands Included in Study

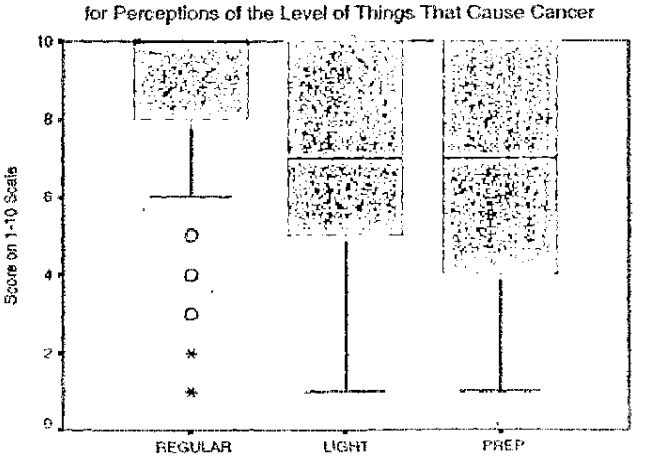
		Mg Tar
Regular	Marlboro	15 mg
	Basic	16 mg
Light	Carlton Ultra Light	1 mg
	Basic Light	11 mg
PREP	ADVANCE	10 mg
	Eclipse	3 mg
	Omni	15 mg

Given the similarity in advertised tar levels of the Light cigarettes and the PREP tobacco products, the absence of significant differences in respondent ratings for the two groups implies that consumer perceptions were reasonably accurate. Moreover, the pattern of responses for PREP tobacco products roughly tracks the relative levels of tar reported in the advertisements. It is noteworthy, however, that study participants' tar ratings for Omni were significantly lower than their ratings for the Regular cigarettes, even though the tar levels reported in the advertisements are essentially the same. This is consistent with research (e.g., Cohen, 1996) that suggests that consumers may not distinguish sharply between their overall perception of the product's health risk and their perception of specific product properties (i.e., the product with the lower perceived overall risk gets the "benefit of the doubt" on specific properties such as the level of tar).

Perception of Level of Things That Might Cause Cancer

Smokers viewed PREP tobacco products as having lower levels of cancer-causing agents than Regular or Light cigarettes. When asked about the level of "things that might cause cancer," survey respondents rated PREP tobacco products (mean = 6.6) lower on the 10-point ladder than Light (mean = 6.9) or Regular cigarettes (mean = 8.8). Both comparisons show statistically significant differences when controlling for demographic characteristics and smoking behaviors (p = 0.001). (Also see Figure 4 and Table 7.)

Figure 4: Distribution of Responses for Perceptions of the Level of Things That Cause Cancer



Separate comparisons between the responses for each of the three PREP tobacco products and those for Light and Regular cigarettes were consistent with the results above. Respondents viewed the ADVANCE (mean = 5.6), Eclipse (mean = 5.1), and

Omni (mean = 5.6) products as each having a significantly lower level of things that might cause cancer in comparison to Light or Regular cigarettes ($p = 0.05$ or less).

The similarity among the ratings for the three PREP tobacco products is again interesting in the context of the advertising content. Only the Omni advertisement specifically used the words "carcinogens" or "cancer." The ADVANCE advertisement emphasized "less toxins," but without further information on the nature of the toxicity, and the Eclipse ad was not specific about the product's properties. Nonetheless, respondents perceived roughly similar advantages across all three PREP tobacco products relative to the Light and Regular comparison points.

Table 7: Consumer Responses to Ads – Product Perceptions

	PREP vs. Light Cigarette Ads *(Significance Test Notes Difference in Mean Response)*	PREP vs. Regular Cigarette Ads *(Significance Test Notes Difference in Mean Response)*
Please tell me where you would put each of the three cigarettes on the health risk ladder.		
3 PREP Ads	(5.4 vs. 5.8)***	(5.4 vs. 8.2)***
ADVANCE	(5.6 vs. 5.8)*	(5.6 vs. 8.2)***
Eclipse	(5.1 vs. 5.8)***	(5.1 vs. 8.2)***
Omni	(5.6 vs. 5.8)*	(5.6 vs. 8.2)***
Please consider these three ads and rate them with respect to the amount of tar you think each product contains		
3 PREP Ads Combined	(5.3 vs. 5.4)	(5.3 vs. 8.4)***
ADVANCE	(5.4 vs. 5.4)	(5.4 vs. 8.4)***
Eclipse	(4.6 vs. 5.4)**	(4.6 vs. 8.4)***
Omni	(5.8 vs. 5.4)	(5.8 vs. 8.4)***
Please consider these three ads and rate them with respect to the level of things that might cause cancer.		
3 PREP Ads Combined	(6.6 vs. 6.9)***	(6.6 vs. 8.8)***
ADVANCE	(6.5 vs. 6.9)***	(6.5 vs. 8.8)***
Eclipse	(6.4 vs. 6.9)*	(6.4 vs. 8.8)***
Omni	(6.8 vs. 6.9)*	(6.8 vs. 8.8)***

Statistical Significance: * = 0.05, ** = 0.01, *** = 0.001 in one-tailed tests.

4: Smokers Who Perceive PREP Tobacco Products as Having Fewer Health Risks

Summary of Findings

- ***A large proportion of study participants perceived PREP tobacco products as having lower health risks than Regular or Light cigarettes.***
  Overall 43% of study participants rated PREP tobacco products as having lower health risks than Light cigarettes, and 75% rated PREP tobacco products as having lower health risk than Regular cigarettes.

- ***Perceptions of PREP tobacco product's health risks relative to Light cigarettes varied little across selected subgroups of the study population.***
  The proportion of study participants who perceived PREP tobacco products to have lower health risks than Lights was quite similar across different demographic groups and groups with different smoking behaviors. Multivariate analysis found no statistically significant differences across groups.

- ***Men, people with lower educational attainment, and white non-Hispanic individuals were more likely than others to perceive that PREP tobacco products pose lower health risks than Regular cigarettes.***
  Although subgroup differences were relatively small, multivariate analysis showed that some demographic characteristics were significantly related to the likelihood of perceiving PREP tobacco products to offer lower health risk than Regular cigarettes. The statistically significant factors were gender, education, and race. Smoking behaviors such as the type of cigarette usually smoked or whether the smoker had attempted to quit recently were not significant predictors.

Analytical Approach

As described Section 3, study participants rated each of the three products for which they saw an advertisement using a health risk ladder scaled from 1 to 10. Each participant's ratings for the three products were compared to determine whether or not the individual perceived the PREP tobacco product to pose lower health risk (*vs.* the same or greater risk) than the Regular or Light cigarette seen in the advertisement. The demographic characteristics and smoking behavior of individuals were examined to determine whether certain population subgroups appeared more likely to see a health advantage in PREP tobacco product. Table 8 presents the percentages of respondents within specific sample subgroups that rated PREP tobacco products lower on the health risk ladder.

The analysis used logistic regression to determine whether specific demographic and smoking characteristics were statistically significant predictors of the probability that an individual would perceive PREP tobacco products as having fewer health risks than Regular or Light cigarettes. A statistically significant coefficient for a characteristic indicates that the characteristic is related to the probability of perceiving a health advantage for PREP tobacco products, conditional on other characteristics represented in the model. Separate models were estimated for the comparisons with Regular and Light cigarettes. The models also included variables representing the specific combination of advertisements that each study participant saw (e.g., Marlboro Regular and

Eclipse, or Carlton Light and ADVANCE), because the response to any one advertisement might depend on which other advertisement the individual saw.[3]

Regression coefficients and significance test results for the estimated models are presented in Table 9. For variables with three or more categories, significance was tested by comparing log likelihood functions for the models with and without the variable.

Comparative Health Risk Ratings

Three-quarters (74.8%) of study participants rated PREP tobacco products lower on the health risk ladder than Regular cigarettes. Another 18.8% rated PREP tobacco products at the same level of health risk as Regulars, while just 6.4% rated PREPs as having higher health risk. These results mean that after viewing an advertisement for the one of three PREP tobacco products used in this study (ADVANCE, Omni, or Eclipse), a large majority of smokers perceive these cigarettes as posing lower health risks than the Regular brands whose advertisements they saw.

Smokers were somewhat less likely to see PREP tobacco products as offering a health advantage over the Light cigarettes whose advertisements they saw. Overall, 42.3% rated PREP tobacco products as having lower health risk than Light cigarettes. Most other smokers (33.6%) gave the PREP and the Light cigarette the same rating, while 24.1% perceived the Light cigarette to pose less health risk.

Population Subgroups Susceptible to Believing PREP Tobacco Products Have Fewer Health Risks

Perceptions of PREP tobacco products as having lower health risks than Regular and Light cigarettes are strikingly consistent across all of the study's sample subgroups (Table 8). The differences across groups defined by demographic characteristics or by smoking behavior are all less than nine percentage points.

When sample subgroups were examined for their ability to predict whether an individual perceived PREP tobacco products as having fewer health risks than Regular cigarettes (Model 1), the following relationships were identified:

- Respondents' **gender** was a significant predictor of this relationship. That is, male respondents were more likely to rate PREP tobacco products lower on the health risk ladder, controlling for other demographic characteristics and smoking behaviors (p = 0.05).
- Individuals who were ***Non-Hispanic Whites*** were more likely (p = 0.05) to view PREP tobacco products as having lower health risks than Regular cigarettes.
- **Educational attainment** was a significant predictor of the probability of perceiving less health risk in PREP tobacco products than Regular cigarettes (p =0.05). Respondents with lower levels of education were more likely to perceive a health advantage in comparison to individuals with college degrees.

[3] Participants were stratified into 6 age-gender groups, and ad combinations were randomly assigned within those groups. There was no forced randomization on other demographic characteristics or on smoking behaviors.

- There was some evidence that **age** also influences the probability of perceiving PREP tobacco products as having a lower health risk, with older participants more likely to see an advantage. However, this relationship was not statistically significant at conventional levels ($p = 0.06$).

These results suggest that individuals with these characteristics may be more receptive, or susceptible, to indirect and direct health messages contained in PREP tobacco product advertising.

Model 2, which examined PREP tobacco product ratings relative to those for Light cigarettes, found no statistically significant relationships between demographic or smoking variables and the likelihood of perceiving that the PREP offered lower health risk. That is, while over two-fifths of all study participants perceived PREP tobacco products to have lower health risk than the Light cigarette whose advertisement they saw, this perception was not concentrated among people with any particular set of characteristics.

Table 8: Percentages of Respondents Who Perceive Less Health Risk in PREP Products in Comparison to Light or Regular Cigarettes

	% Respondents Who Perceived PREPs as *Having Lower Health Risk* Than Light Cigarettes	% Respondents Who Perceived PREPs as *Having Lower Health Risk* Than Regular Cigarettes
% of Total Sample	42.4%	74.8%
Age		
18-30 years	38.1%	69.5%
31-50 years	45.6%	77.9%
Over 51 years	43.7%	77.4%
Gender		
Female	41.5%	73.6%
Male	43.5%	76.4%
Educational Attainment		
High School Graduate or Less	46.3%	78.4%
Some Education Beyond High School, But Not College Graduate	40.8%	73.5%
College Graduate or Other Higher Educational Degree	37.7%	70.8%
Race/Ethnicity		
White, Non-Hispanic	43.0%	77.7%
Non-White	41.2%	67.9%
Average Number of Cigarettes Smoked Per Day (Within Last 30 Days)		
10 or less	40.6%	70.3%
11-20	41.4%	76.4%
More than 20	48.6%	79.3%
Usual type of Cigarette Smoked		
Regular	42.1%	73.3%
Light	44.3%	78.1%
Ultra Light	34.3%	77.1%
Attempted to Quit During Past Year		
Yes	41.8%	75.3%
No	43.1%	74.8%

Table 9: Regression Coefficients for Factors Potentially Related to the Probability of Perceiving Lower Health Risk with PREP Tobacco Products

	Regression Coefficients for Dependent Variables	
Independent Variable	PREPs *Have Lower Health Risk* Than Light Cigarettes	PREPs *Have Lower Health Risk* Than Regular Cigarettes
Age		
18-30 years	-0.09	-0.37
31-50 years	0.23	0.06
Over 51 years (omitted category)		
Gender		
Female	-0.02	-0.19*
Male (omitted category)		
Educational Attainment		
High School Graduate or Less	0.41	0.63*
Some Education Beyond High School, But Not College Graduate	0.18	0.22*
College Graduate or Other Higher Educational Degree (omitted category)		
Dummy Variable for Race/Ethnicity		
White, Non-Hispanic	0.15	0.46*
Non-White (omitted category)		
Average Number of Cigarettes Smoked Per Day (Within Last 30 Days)		
10 or less	-0.45	-0.44
11-20	-0.40	-0.17
More than 20 (omitted category)		
Usual Type of Cigarette Smoked		
Regular	-0.15	-0.40
Light/Ultra Light/Other (omitted category)		
Quit Attempt in Past Year		
Yes	-0.05	0.12
No (omitted category)		
Ad Combinations		
Marlboro and Eclipse		0.87**
Basic and Eclipse		0.20
Marlboro and ADVANCE		0.64
Basic and ADVANCE		0.06
Marlboro and Omni		0.57
Basic and Omni (omitted category)		
Carlton Light and Eclipse	-0.74*	
Basic Light and Eclipse	0.48	
Carlton Light and ADVANCE	-0.53	
Basic Light and ADVANCE	0.20	
Carlton Light and Omni	-0.45	
Basic Light and Omni (omitted category)		
Dummy Variable for Light Cigarette Ad		-0.03
Dummy Variable for Regular Ad	0.11	
Log Likelihood Function for Model	-388.25	-320.19

*Statistical Significance: * = 0.05 ** = .01 *** = .001*

5: Smokers' Interpretations of PREP Tobacco Product Advertising Messages

Summary of Findings

- ***Most smokers interpreted the PREP tobacco product advertisements as conveying positive messages about health and safety.***
  Overall, 62% of study participants believed that the PREP tobacco product advertisement they saw conveyed a message that "this cigarette is safer or healthier than others." Far fewer smokers saw such messages in advertisements for Regular or Light cigarettes.

- ***Many smokers interpreted the PREP advertisements as saying that these products would be helpful in quitting smoking.***
  Two out of five study participants (40%) perceived the PREP tobacco product advertisement to convey the message that "this cigarette will help someone quit smoking." Significantly fewer smokers found this message in advertisements for Regular or Light cigarettes.

- ***Most smokers believed that claims made in cigarette advertisements must be approved by a government agency.***
  Two thirds of study participants (67%) responded positively to the question, "If an advertisement claims that a cigarette has less dangerous substances, do you think that a government agency has to approve the claim?"

Analytical Approach

After viewing advertisements for one tobacco product for each of the three cigarette types (Regular, Light and PREP), survey participants were asked four questions about particular messages that they believed each advertisement conveyed. The four possible messages concerned the product's *taste*, *safety and health*, *peer acceptance*, and *ability to help someone quit smoking*. (For specific questionnaire wording, see Key Measures in Section 2.) Table 10 and Figure 5 present the response frequencies, by tobacco product type, for each of these questions.

Response frequencies for each advertising message were tested to determine whether there were statistically significant differences in the likelihood that particular messages were seen in the advertisements for specific product types. A Probit regression modeling approach with a dichotomous dependent variable was used to test for differences in response frequencies between cigarette types for each of the four possible advertising messages. A random effect accounted for clustering.

Smokers' Understanding of PREP Tobacco Product Advertising Messages

Product Taste

Study participants identified advertisements for Regular (62.2%) and Light (44.3%) cigarettes as conveying positive messages about product taste more frequently than advertisements for PREP tobacco products (33.3%). The differences are statistically significant in analyses controlling for demographic characteristics and smoking behaviors ($p = 0.001$).

This pattern showed some variation across the three PREP tobacco products. The percentages of respondents who perceived that the advertisement conveyed a "taste message" ranged from 24.1% for Eclipse to 40.9% for ADVANCE. The Eclipse and Omni percentages were significantly lower than those for both Regular and Light cigarettes ($p = 0.01$ or lower). The percentage for the ADVANCE advertisement was also significantly lower than the percentage for Regular cigarettes, but was not significantly different from the percentage for Lights. The ADVANCE advertisements, which included the tag line, "All of the taste . . . less of the toxins," placed the most explicit emphasis on the product's taste.

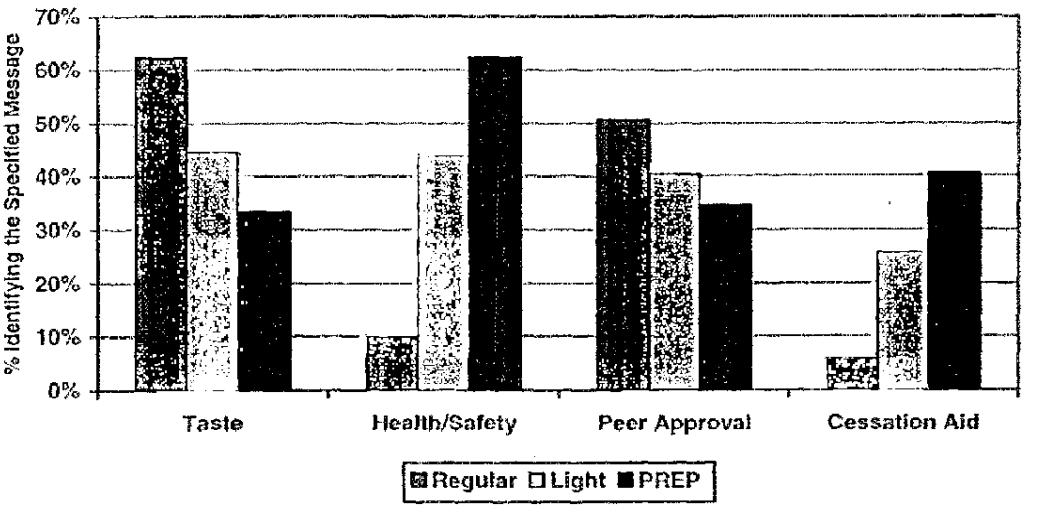
Safety and Health

Most smokers believed that the PREP advertisements they saw conveyed the message that "this cigarette is safer or healthier than others." Overall, 62.3% of study participants interpreted advertisement messages for PREP tobacco products as saying they were safer or healthier than other cigarettes. In contrast, only 43.7% saw this message in the advertisements for Light cigarettes, and only 10.0% saw it in the ads for Regular cigarettes (see Figure 4 and Table 10). These differences were statistically significant in multivariate analyses ($p = 0.001$).

This general pattern applied to each of the three PREP advertisements individually. That is, the percentage seeing a "safer or healthier" message in the advertisements for ADVANCE (63.2%), Eclipse (62.1%), and Omni (61.6%) was significantly greater than the percentages finding this message in the Light or Regular cigarette advertisements ($p = 0.001$).

The similarity in results across the three PREP tobacco product advertisements is quite striking, particularly given the differences in the content of the advertisements. The ADVANCE advertisement emphasized less toxins, the Eclipse advertisement argued that the product was "the next best choice" to quitting "for smokers who worry about their health," and the Omni advertisement emphasized reduced carcinogens. All three advertisements contained an explicit statement to the effect that "smoking is not safe." Nonetheless, more than 62% of the smokers who saw each advertisement believed that it contained a positive message about health or safety.

Figure 5: Interpretations of Advertising Messages - Percent of Respondents Perceiving Specified Ad Messages, By Type of Tobacco Product



Peer Approval

Smokers were more likely to interpret advertising for Regular and Light cigarettes than for PREP tobacco products as conveying a message about peer approval for smoking a specific brand. About half (50.7%) of the study's participants interpreted advertisements for Regular cigarettes as having a message that this is a "good cigarette to smoke with friends." Similarly, 40.3% of respondents identified this same message in Light cigarette advertisements. Significantly fewer smokers (34.7%) identified this message in PREP tobacco product advertisements. These differences were significant in analyses controlling for demographic and smoking characteristics ($p = 0.05$ or less). However, the difference between PREP and Light advertisements was not statistically significant for ADVANCE or Omni when analyzed separately.

Cessation Aid

Two-fifths of the study participants (40.5%) interpreted the PREP advertisement they saw as suggesting that the product would help someone quit smoking. This was considerably higher than the proportion who perceived such a message in advertisements for Light (25.7%) or Regular (5.7%) cigarettes. Both differences were statistically significant in multivariate analyses at $p = 0.001$.

Comparisons of the individual PREP tobacco products followed this general pattern for ADVANCE and Eclipse. The percentage who saw the "help someone quit" message in the Omni advertisement (31.0%) was not significantly different from the percentage who saw that message in the Light cigarette advertisements, although it was significantly greater than the percentage for the Regular cigarette advertisements (5.7%).

It is perhaps not surprising that the Eclipse advertisement, with the message of "next best choice" to quitting explicitly stated, had the highest percentage of respondents interpreting the

advertisement as saying that the product would help someone quit. The ADVANCE advertisement highlights the phrase "a step in the right direction," which may have been interpreted in the same way.

Smokers' Perceptions of Cigarette Advertising Regulations

Study participants were asked, "If an advertisement claims that a cigarette has less dangerous substances, do you think that a government agency has to approve the claim?" Two-thirds of the participants (67.1%) responded in the affirmative. This proportion was not significantly related to the messages that the smokers believed they saw in the advertisements. Thus, 72.4% of individuals who believed that PREP tobacco product advertisements said they were healthier or safer than other cigarettes also believed that a government agency must approve claims made in cigarette advertisements. Similarly, 71.0% of smokers who identified PREP tobacco product advertisements as conveying a message that the product would help someone quit smoking believed that cigarette advertisement claims had to be approved by a government agency.

These results suggest that the majority of smokers who viewed PREP tobacco product advertisements believed that any message they receive about potential reductions in health risks had been previously approved by a government agency, and carries whatever credibility government approval confers.

Table 10: Consumer Responses to Ads – Perceptions of Ad Messages

	PREP vs. Light Cigarette Ads *(Significance Test Notes Difference in Percentages of "Yes" Responses)*	PREP vs. Regular Cigarette Ads *(Significance Test Notes Difference in Percentages of "Yes" Responses)*
This cigarette tastes better than others.		
3 PREP Ads Combined	(33.3% vs. 44.3%)***	(33.3% vs. 62.2%)***
ADVANCE	(40.9% vs. 44.3%)	(40.9% vs. 62.2%)***
Eclipse	(24.1% vs. 44.3%)***	(24.1% vs. 62.2%)***
Omni	(35.0% vs. 44.3%)**	(35.0% vs. 62.2%)***
This cigarette is safer or healthier than others.		
3 PREP Ads Combined	(62.3% vs. 43.7%)***	(62.3% vs. 10.0%)***
ADVANCE	(63.1% vs. 43.7%)***	(63.1% vs. 10.0%)***
Eclipse	(62.1% vs. 43.7%)***	(62.1% vs. 10.0%)***
Omni	(61.6% vs. 43.7%)***	(61.6% vs. 10.0%)***
This cigarette is a good one to smoke when you're with friends.		
3 PREP Ads Combined	(34.7% vs. 40.3%)*	(34.7% vs. 50.7%)***
ADVANCE	(34.3% vs. 40.3%)	(34.3% vs. 50.7%)***
Eclipse	(32.2% vs. 40.3%)**	(32.2% vs. 50.7%)***
Omni	(37.44% vs. 40.3%)	(37.4% vs. 50.7%)***
This cigarette will help someone quit smoking.		
3 PREP Ads Combined	(40.5% vs. 25.7%)***	(40.5% vs. 5.7%)***
ADVANCE	(40.9% vs. 25.7%)***	(40.9% vs. 5.7%)***
Eclipse	(49.8% vs. 25.7%)***	(49.8% vs. 5.7%)***
Omni	(31.0% vs. 25.7%)	(31.0% vs. 5.7%)***

*Statistical Significance: * = 0.05 ** = 0.01 *** = 0 .001*

6: Implications of the Findings

The study's findings confirm public health, medical and tobacco control professionals' concerns that advertising for PREP (potential reduced-exposure products) tobacco products may lead smokers to conclude that these products pose fewer tobacco-related health risks than conventional Regular and Light cigarettes. In side-by-side comparisons, smokers indicated that they thought PREP products posed fewer tobacco-related health risks than either Regular or Light cigarettes. This consumer interpretation of the advertising may pose a public health risk, because there is not yet a sufficient scientific basis for concluding that PREP tobacco products are associated with a reduced risk of tobacco-related disease compared to conventional Regular and Light tobacco products (IOM, 2001).

These results lend support to the Institute of Medicine's (IOM) recommendation that:

> Consumers [must be] fully and accurately *informed* of all the known, likely, and potential consequences of using these products (IOM, 2001, p.7)

The smokers participating in the study clearly based their conclusions regarding PREP tobacco products' health risk on the messages and information they perceived in PREP advertisements. Prior to participating in this study, only a few smokers had seen advertisements for or had smoked PREP tobacco products. For the vast majority, the only direct source of information for assessing PREP tobacco products' health and safety was the advertisement they viewed during the study. Most smokers (62%) believed that the PREP advertisement they saw conveyed the message that the PREP product was "safer or healthier than other cigarettes." Based on this information, a large majority of smokers (75%) rated the PREP as posing less health risk than the Regular cigarette whose advertisement they saw. In addition, 42% rated the PREP as having lower health risk than the Light cigarette, while only 24% rated the Light as having less risk.

Most study participants (67%) believed that "if an advertisement claims that a cigarette has less dangerous substances, . . . a government agency has to approve the claim." As a result, most smokers who perceived PREP tobacco products as posing fewer tobacco-related health risks believed that this information had somehow been evaluated and approved by a government agency.

These results support another IOM recommendation:

> Promotion, advertising, and labeling of these products [should be] firmly *regulated* to prevent false or misleading claims, explicit or implicit (IOM, 2001, p. 7).

Study Limitations and Further Research Needs

This study examined a relatively small number of advertisements with a convenience sample of smokers in Massachusetts. The results cannot be generalized to all advertisements or to the full population of smokers in the United States. Further, larger-scale research would be needed to obtain precise national estimates, although the strength and consistency of the findings here make it likely that a larger study would reveal substantially similar patterns.

While this study provides useful information for furthering our understanding of how smokers perceive PREP tobacco products, the study results suggest that two additional topics need exploration. First, this study includes current smokers only, and it will be important to examine the PREP effects on former smokers and on people who have not previously smoked.

Second, because a substantial proportion of study participants perceived the PREP advertisements as conveying a message that the product would "help someone quit smoking," it will be important to determine whether smokers may switch to PREP tobacco products as an alternative to quitting.

Finally, although this analysis focused primarily on PREP tobacco products, the study participants' responses regarding Light cigarettes suggest that incorrect perceptions of these latter products continue to pose an important public health issue. Despite the substantial scientific evidence showing that Light cigarettes do not reduce health risks relative to Regular cigarettes (NCI, 2001), the smokers in the study clearly believed in a lower risk with Lights. Additional research is needed to determine how this misperception is perpetuated and how it can be corrected.

References

Burns, D.M., & Benowitz, W.L. (2001). Public Health Implications of Changes in Cigarette Design and Marketing. Risks Associated with Smoking Cigarettes with Low Machine-Measured Yields of Tar and Nicotine. Smoking and Tobacco Control Monograph No. 13. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute.

Cohen, J.B. (1996). Smokers' Knowledge and Understanding of Advertised Tar Numbers: Health Policy Implications. American Journal of Public Health, 1996, Vol. 86: 18-24.

Institute of Medicine. (2001). Clearing the Smoke: Assessing the Science Base for Tobacco Harm Reduction. Washington D.C., National Academy Press.

National Cancer Institute. (2001). Risks Associated with Smoking Cigarettes with Low Machine-Measured Yields of Tar and Nicotine. Smoking and Tobacco Control Monograph No. 13. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute.

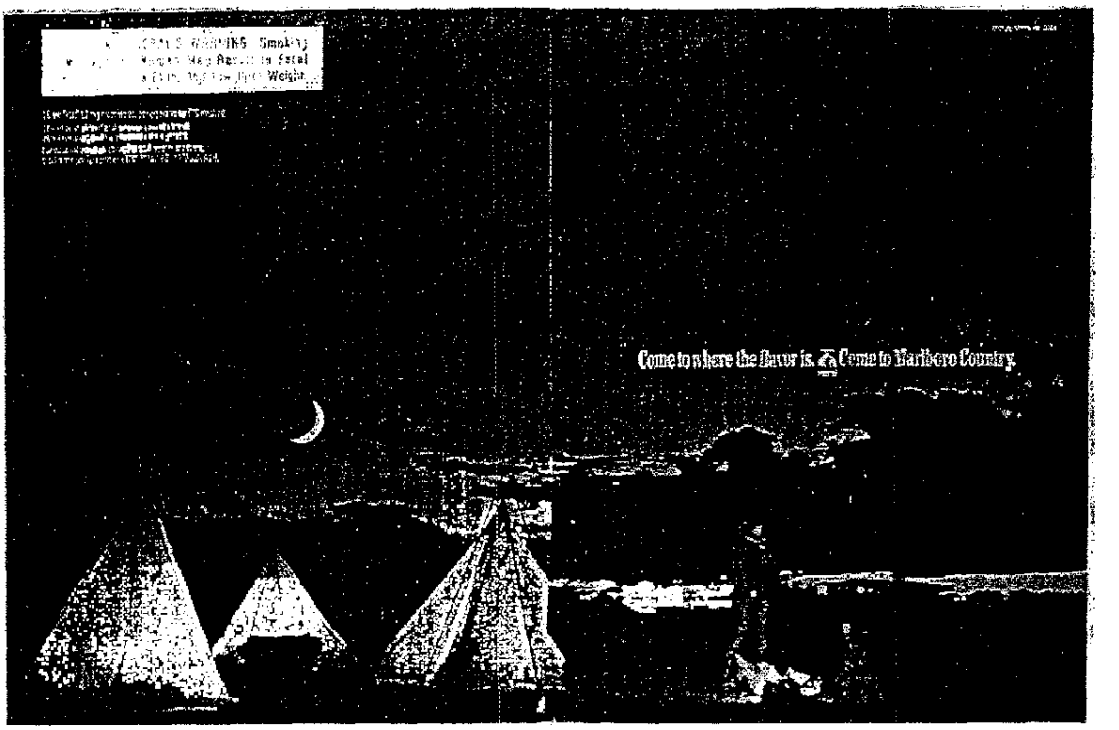
Pollay, R.W., & Dewhirst, T. (2001). Marketing Cigarettes with Low Machine-Measured Yields. Risks Associated with Smoking Cigarettes with Low Machine-Measured Yields of Tar and Nicotine. Smoking and Tobacco Control Monograph No. 13. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute.

Weinstein, N.D. (2001). Public Understanding of Risk and Reasons for Smoking Low-Yield Products. Risks Associated with Smoking Cigarettes with Low Machine-Measured Yields of Tar and Nicotine. Smoking and Tobacco Control Monograph No. 13. Bethesda, MD: U.S. Department of Health and Human Services, National Institutes of Health, National Cancer Institute.

APPENDIX A

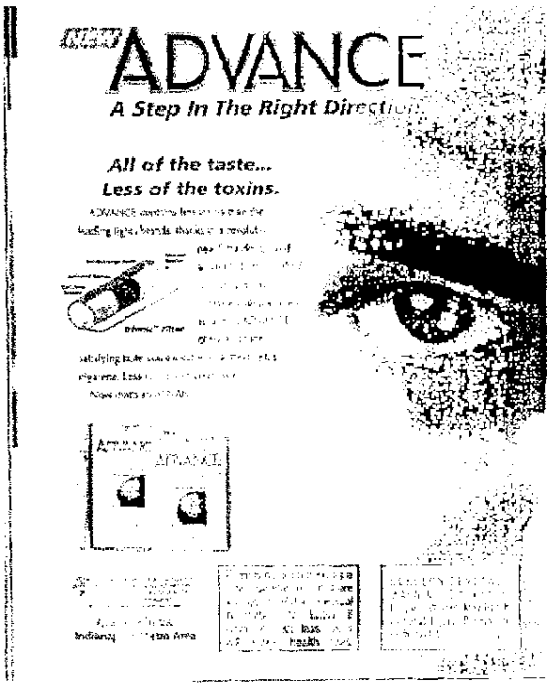
ADVERTISEMENTS SHOWN TO STUDY RESPONDENTS

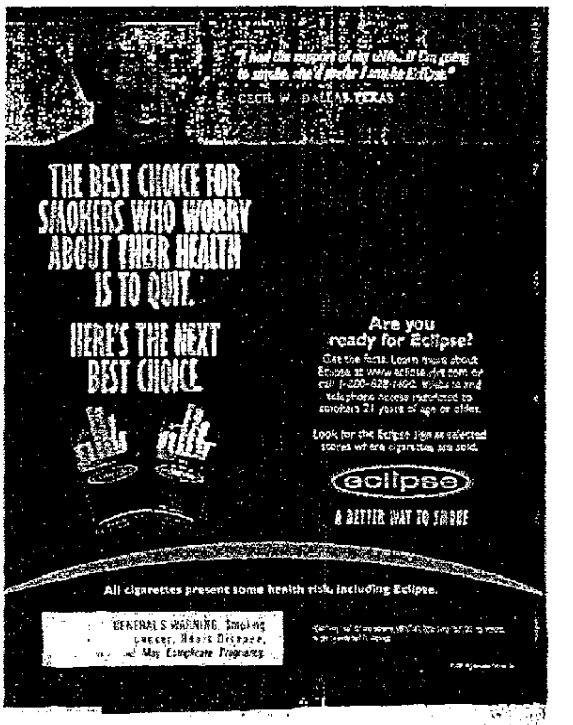
Advertisements for Regular Cigarettes



Advertisements for Light Cigarettes

Advertisements for Potentially Reduced-Exposure Products





APPENDIX B

SURVEY OF SMOKERS' PERCEPTIONS OF POTENTIALLY REDUCED EXPOSURE PRODUCT ADVERTISEMENTS

May 2002

72 variations of the questionnaire were created, in an effort to achieve an equal distribution of cases that were shown regular, light, and reduced harm ads in three different possible orders:

- Regular, Light, PREP
- Regular, PREP, Light
- Light, PREP, Regular
- Light, Regular, PREP
- PREP, Light, Regular
- PREP, Regular, Light

The order of the advertisements was the same in questions B4-12 as it was in B 13-24.

There were seven different ads selected. Each questionnaire had the specific ad name inserted in the instrument. The ads were as follows:

Regular
- Basic
- Marlboro

Light
- Basic Light
- Carlton Light

PREP
- Advance
- Eclipse
- Omni

Brand names were inserted in items B1-2a, B 4-12, and B13-24.

Affix Label Here of
Ads shown to Respondent

Screener Information

Hi! I am doing a survey on people's opinions about some advertisements. To see if you are eligible to participate in the study, I need to get some information about you.

S1. First, are you a Massachusetts resident?	❑1 Yes ❑2 No **(SKIP TO CLOSING 1)**
S2. **INTERVIEWER FILL IN SEX OF RESPONDENT.**	❑1 Male ❑2 Female
S3. Are you…	❑1 Less than 18 years old **(SKIP TO CLOSING 1)** ❑2 18-30 years old ❑3 31-50 years old ❑4 Over 51 years old
S4. Have you smoked 100 cigarettes in your lifetime?	❑1 Yes ❑2 No **(SKIP TO CLOSING 1)**
S5. Do you currently smoke some days, every day, or not at all?	❑1 Some days ❑2 Every day ❑3 Not at all **(SKIP TO CLOSING 1)**
S6. Have you smoked one or more cigarettes during the past 30 days?	❑1 Yes ❑2 No **(SKIP TO CLOSING 1)**

CLOSING 1: Thank you for your help with our survey. We appreciate your time, have a nice day.

A. Smoking

A1. During the past 30 days, about how many cigarettes did you usually smoke per day?	❑1 SPECIFY: _____ cigarettes
A2. Do you usually smoke regular, light, or ultra-light, or another type of cigarettes?	❑1 Regular **(SKIP TO A3)** ❑2 Light ❑3 Ultra-light ❑4 Other Type **(SKIP TO A3)**
A2a. I am going to read a list of reasons why some people smoke light or ultra light cigarettes. Please tell me which, if any, of these are the reasons you smoke light or ultra light cigarettes **(CHECK ALL THAT APPLY):**	❑1 Step towards quitting ❑2 Reduced risk of health problems ❑3 Reduced tar ❑4 Reduced Nicotine ❑5 Prefer taste ❑6 None of these
A3. What is your usual brand of cigarettes?	❑1 SPECIFY: _____ brand
A4. During the past 12 months, did you intentionally quit smoking for one day or longer?	❑1 Yes ❑2 No (SKIP TO B1)
A4a. **(IF YES)** How many times did you quit for at least one day in the past 12 months?	❑1 SPECIFY: _____ times

B. Advertisements

Now I'm going to show three cigarette advertisements that have appeared in magazines. Please look at each of them. Look for about as long as you would if you came upon the ad for the first time in a magazine.

B1. Have you seen ads for any of these particular cigarette brands before?	❑1 Yes ❑2 No (**SKIP TO B2**)
B1a. **(IF YES)** Which brands have you seen advertised previously? [CHECK ALL THAT APPLY].	❑1 Regular ❑2 Light ❑3 Reduced Harm
B2. Have you ever smoked any of the three cigarette brands?	❑1 Yes ❑2 No (**SKIP TO B3**)
B2a. **(IF YES)** Which brands have you smoked?	❑1 Regular ❑2 Light ❑3 Reduced Harm

(SHOW CARD) This card has three health risk ladders that go from 1 to 10. The bottom rung of the ladder means very low health risk, which implies that even if you smoked the cigarette regularly for a long time, like 20 or 30 years, you probably wouldn't get a serious health problem. The top rung of the ladder means very high health risk, which implies that if you smoked the cigarette regularly for a long time you'd be very likely to get a serious health problem. Please tell me where you would put each of the three cigarettes on the health risk ladder

B4.	Let's start with **[AD 1]**, where would you put that cigarette on the ladder?	☐ 10 **HIGH** ☐ 9 ☐ 8 ☐ 7 ☐ 6 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 **LOW**
B5.	What about **[AD 2]**?	☐ 10 **HIGH** ☐ 9 ☐ 8 ☐ 7 ☐ 6 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 **LOW**
B6.	And what about **[AD 3]**?	☐ 10 **HIGH** ☐ 9 ☐ 8 ☐ 7 ☐ 6 ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 **LOW**

Looking at these ladders again, please consider these three ads again – this time rating them from 1-10 with respect to the amount of **tar** you think each product contains. A rating of "10" would mean you see the product as having a high tar content and a rating of "1" means you think this cigarette has a low tar content. B7. Let's start with **[AD 1]**, where would you put that cigarette on the ladder?	☐10 **HIGH** ☐9 ☐8 ☐7 ☐6 ☐5 ☐4 ☐3 ☐2 ☐1 **LOW**
B8. What about **[AD 2]**?	☐10 **HIGH** ☐9 ☐8 ☐7 ☐6 ☐5 ☐4 ☐3 ☐2 ☐1 **LOW**
B9. And what about **[AD 3]**?	☐10 **HIGH** ☐9 ☐8 ☐7 ☐6 ☐5 ☐4 ☐3 ☐2 ☐1 **LOW**

Looking at these ladders again, please consider these three ads again – this time rating them from 1-10 with respect to the level of **things that might cause cancer** you think each product contains. A rating of "10" would mean you see this cigarette as having a high content of things that might cause cancer and a rating of "1" means you think the product has a low content of things that might cause cancer. B10. Let's start with **[AD 1]**, where would you put that cigarette on the ladder?	❑10 **HIGH** ❑9 ❑8 ❑7 ❑6 ❑5 ❑4 ❑3 ❑2 ❑1 **LOW**
B11. What about **[AD 2]**?	❑10 **HIGH** ❑9 ❑8 ❑7 ❑6 ❑5 ❑4 ❑3 ❑2 ❑1 **LOW**
B12. And what about **[AD 3]**?	❑10 **HIGH** ❑9 ❑8 ❑7 ❑6 ❑5 ❑4 ❑3 ❑2 ❑1 **LOW**

Now I'd like you to think about the three advertisements that you saw. I want to know what message you think each ad is trying to give you.

Look at the ad for **[AD 1]** while I read off some possible messages. For each possible message, tell me whether you think this is what the ad is trying to say.	
B13. This cigarette tastes better than others.	❑1 Yes ❑2 No
B14. This cigarette is safer or healthier than others.	❑1 Yes ❑2 No
B15. This cigarette is a good one to smoke when you're with friends.	

B16. This cigarette will help someone quit smoking.	❑1 Yes ❑2 No ❑1 Yes ❑2 No
Now look at the ad for **[AD 2]** and tell me about the messages there.	
B17. This cigarette tastes better than others.	❑1 Yes ❑2 No
B18. This cigarette is safer or healthier than others.	❑1 Yes ❑2 No
B19. This cigarette is a good one to smoke when you're with friends.	❑1 Yes ❑2 No
B20. This cigarette will help someone quit smoking.	❑1 Yes ❑2 No
Now look at the ad for **[AD 3]** and tell me about the messages there.	
B21. This cigarette tastes better than others.	❑1 Yes ❑2 No
B22. This cigarette is safer or healthier than others.	❑1 Yes ❑2 No
B23. This cigarette is a good one to smoke when you're with friends.	❑1 Yes ❑2 No
B24. This cigarette will help someone quit smoking.	❑1 Yes ❑2 No

C. Advertising in Magazines

Finally, I want to ask a couple of questions about how the government deals with advertising in magazines.	
C1. If an advertisement for a medicine claims that it relieves pain, do you think that a government agency has to approve the claim?	❑1 Yes ❑2 No
C2. What about food products? If an advertisement claims that a food has low cholesterol, do you think that a government agency has to approve the claim?	❑1 Yes ❑2 No
C3. What about cigarettes? If an advertisement claims that a cigarette has less dangerous substances, do you think that a government agency has to approve the claim?	❑1 Yes ❑2 No

D. Demographics

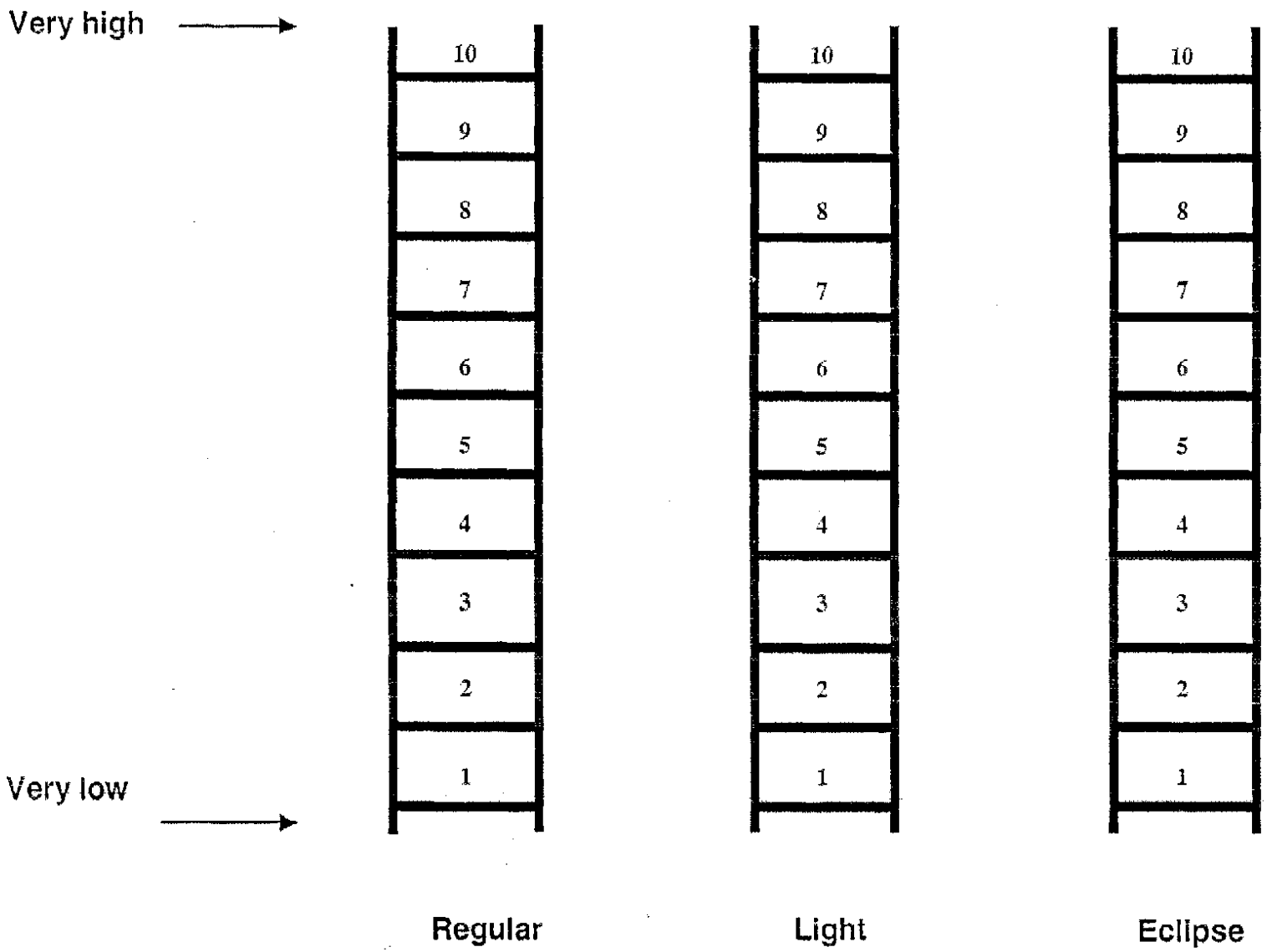
D1. What is the highest grade or year of regular school that you have completed?	❑1 No formal schooling ❑2 Did not complete High School ❑3 High school diploma or GED ❑4 Technical or vocational training after high school ❑5 Some college ❑6 College Graduate ❑7 Graduate education after college
D2. What is your current personal status?	❑1 Single ❑2 Living with a domestic partner ❑3 Married ❑4 Widowed ❑5 Separated ❑6 Divorced

D3. What is your current employment status?	❑1 Working full-time (35 hours or more per week) ❑2 Working part-time ❑3 Not employed
D4. What is your date of birth?	❑1 _____ / _____ / _____ Month Day Year
D5. Which of the following do you consider yourself to be?	❑1 Hispanic or Latino ❑2 Not Hispanic or Latino
D6. Which of the following do you consider yourself to be? You may chose more than one. **(INTERVIEWER: CHECK ALL BOXES THAT APPLY)**	❑1 White ❑2 Black or African American ❑3 Asian ❑4 American Indian or Alaska Native ❑5 Native Hawaiian or Pacific Islander

CLOSING 2: Those are all the questions that I have for you. Thank you for participating in this survey. In appreciation for your time, please accept $10 for your participation.

SAMPLE LADDER AID

Ladder Aids were customized to reflect the specific cigarette advertisement viewed by respondents.



PM3001396155